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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,272	11/30/2001	Sam Ziqun Zhao	1875.2200001	2600
26111	7590	04/13/2004	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			ZARNEKE, DAVID A	
			ART UNIT	PAPER NUMBER
			2827	
DATE MAILED: 04/13/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/997,272

Applicant(s)

ZHAO ET AL.

Examiner

David A. Zarneke

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2004.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 39-43 and 61-78 is/are pending in the application.  
4a) Of the above claim(s) 61-67 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☐ Claim(s) 39-43 and 68-78 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 2/3/04 have been fully considered but they are not persuasive.

Applicant has presented four arguments and one comment stating the patentability of the present claims over the cited art.

The first argument is that Pastore does not describe a stiffener that has a first surface attached to a second surface of a substrate, as recited in claim 39.

The examiner asserts that Pastore (figure 2) does indeed teach a stiffener (37) with a first surface attached to a second surface of a substrate (14). As seen in figure 2, one surface of the stiffener (37) is attached to the substrate (14); the examiner is calling this surface the first surface.

The second argument is that Pastore teaches (37) to be trace-like and does not teach or suggest (37) as being a stiffener.

The examiner asserts, as discussed in the previous office action, that while Pastore fails to teach (37) as being a stiffener, it inherently acts as one. Pastore teaches the layer (37) as being made of two layers of metal (6, 3+) that is as thick as possible (6, 41+) to improve manufacturability and reliability (6, 44+). One of ordinary skill in the art would know that a thick multiple layer metal would inherently impart stiffening qualities upon the device package.

The third argument presented is that Pastore does not teach or suggest a heat slug that has a first surface attached to a portion of the first surface of the stiffener through a window opening in the substrate, as recited in claim 39.

The examiner asserts that Pastore, in figure 2, does indeed teach a heat slug (28) that has a first surface attached to a portion of the first surface of the stiffener (37) through a window opening in the substrate (14). The first surface of the stiffener is the same surface that is attached to the substrate, as discussed above in the first argument.

The fourth argument presented is that Mertol, Carden and Niwa do not teach the missing elements of Pastore.

The examiner asserts that since Pastore is not missing any parts, as discussed above, what Mertol, Carden and Niwa teach is irrelevant with respect to the supposed missing parts.

The comment made by applicant asks that the provisional double patenting rejections presented in the previous office action be held in abeyance until the time that allowable subject matter is indicated.

The examiner agrees to wait until such time as allowable subject matter has been identified to require applicant to address these rejections.

### ***Election/Restrictions***

Newly submitted claims 71-74 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the originally presented claims require the bump on the FIRST portion and the slot on the SECOND

portion, while these claims require the bump on the SECOND portion and the slot on the FIRST portion.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 71-74 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Objection Warning***

Applicant is advised that should claims 40 and 41 be found allowable, claims 71 and 74 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Applicant is advised that should claims 42 and 43 be found allowable, claims 75 and 78 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 39-41, 68-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pastore et al., US Patent 5,285,352, in view of Mertol, US Patent 6,011,304.

Pastore teaches a ball grid array (BGA) package (Figure 2), comprising:

a substrate (14) that has opposing first and second surfaces, wherein said substrate has a window opening (30) through said substrate that is open at said first surface and said second surface;

a stiffener (37) that has a surface attached to said second surface of said substrate, wherein said stiffener further has a second surface having a mounting location for an integrated circuit (IC) die (12); and

a heat slug (28) that has a first surface attached to a portion of said surface of said stiffener through said window opening, wherein said heat slug has a second surface that is capable of being mounted to a printed circuit board (PCB).

Though Pastore teaches the plated, metallized area (37) as serving two purposes, one being to improve thermal conduction, and the other being to act as a ground plane (6, 20+), it inherently would also act as a stiffener. Pastore teaches the layer (37) as being made of two layers of metal (6, 3+) that is as thick as possible (6, 41+) to improve manufacturability and reliability (6, 44+). One of ordinary skill in the art would know that a thick multiple layer metal would inherently impart stiffening qualities upon the device package.

Pastore fails to teach the stiffener including a first portion of a locking mechanism and said heat slug includes a second portion of said locking mechanism, wherein said locking mechanism aligns said heat slug with said stiffener when coupled together.

Mertol teaches a device package having a stiffener (11) with slots (12) and a heat sink (21) with surface bumps (14) [Figure 5B].

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the locking mechanism of Mertol in the invention of Pastore because Mertol teaches that the locking mechanism secures heat sink to the stiffener while allowing the heat sink to be easily removed (3, 1+).

Regarding claims 40 and 71, Mertol teaches a device package having a stiffener (11) with slots (12) and a heat sink (21) with surface bumps (14) [Figure 5B] that couple together.

Regarding claims 41 and 74, while Mertol fails to teach using an adhesive to adhere the bump in the slot, the use of an adhesive to attach two materials together is conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious. *In re Raner* 134 USPQ 343 (CCPA 1962).

As to claim 68, while Pastore teaches the solder ball (26) on the heat slug permits external accessibility to the die (12) without specifically mentioning to what the die can be externally bonded to, a PCB externally connected to the die through the balls on the heat slug is conventionally known in the art. The use of conventional materials to perform there known functions in a conventional process is obvious (*In re Aller* 220 F.2d 454,456,105 USPQ 233,235 (CCPA 1955)).

In re claims 69, 73 and 76, barring a showing of unexpected results, the location of the first portion of the locking mechanism on the stiffener is an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).



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Regarding claims 70, 72 and 77, barring a showing of unexpected results, the location of the second portion of the locking mechanism on the heat slug is an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).

Claims 42, 43, 75 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pastore et al., US Patent 5,285,352, in view of Mertol, US Patent 6,011,304, as applied to claims 39-41 above, and further in view of Carden, US Patent 6,552,266, or Niwa, US Patent 5,998,241.

Regarding claims 42 and 75, Pastore and Mertol both fail to teach the heat slug having the slot and the stiffener having the surface bump.

Both Carden and Niwa teach a heat slug having a slot and a stiffener having a surface bump that inserts into the slot (see Figures).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the locking mechanism of either Carden or Niwa in the invention of Pastore because Carden teaches that this locking mechanism properly aligns the heat slug to the stiffener and aids in the attaching of the two together.

With respect to claims 43 and 78, while both Carden and Niwa fail to teach using an adhesive to adhere the bump in the slot, the use of an adhesive to attach two materials together is conventionally known in the art. The use of conventional materials to perform their known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 39-43 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-45 of copending Application No. 10/284,166, claims 1-12, 22 and 24-32 of copending Application No. 10/284,312, claims 14-22 of copending Application No.s 10/201,309, 10/284,371, 10/200,336, 10/201,893, 10/201,891, 10/197,438, and 09/742,366. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: the claims of these copending applications contain substantially the same subject matter, except for the locking mechanism of the present application.

As noted above, these provisional double patenting rejections will be held in abeyance until such time that allowable subject matter is indicated.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

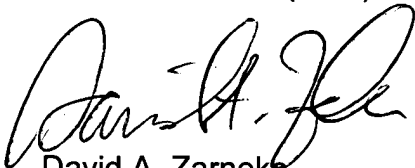
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-F 10 AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "David A. Zarneke". The signature is fluid and cursive, with the first name "David" being the most prominent part.

David A. Zarneke  
Primary Examiner  
April 7, 2004